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Dewetting Processes in Ultra-thin Epitaxial Ag Films on Si(111) CHARLOTTE E. SANDERS, JISUN KIM, C.K. SHIH, UT Austin — The authors have recently reported the development of a technique to grow large-area, single-crystal, atomically smooth Ag films on Si(111), and have demonstrated the utility of such films for plasmonics applications: the films support surface plasmon polaritons with extremely low damping. Although the authors have observed that films with thickness on the order of several tens of nanometers can be relatively stable against dewetting—at least on a time scale long enough for fabrication and EOT probing under ambient conditions—they have also seen that very thin Ag films (e.g., 5 nm) start dewetting under ambient conditions within about 24 hours. This raises an important question: how and why does dewetting occur? The authors have now undertaken a detailed and systematic study of the mechanism of dewetting in epitaxial Ag films on Si(111) as a function of film thickness. The current presentation will focus on this work, and will attempt to shed light on the apparent robustness of films grown using their method.

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